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HAMILTON, BROOK, SMITH & REYNOLDS, P.C.
530 VIRGINIA ROAD
P.O. BOX 9133
CONCORD, MA 01742-9133

EXAMINER	
NOGUEROLA, ALEXANDER STEPHAN	
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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/600,177
Filing Date: June 20, 2003
Appellant(s): BARRINGER ET AL.

Mark Solomon
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed November 02, 2009 appealing from the Office action mailed January 27, 2009.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

US 6,402,919 B1	VIRTANEN	6-2002
US 7,060,171 B1	NIKIFOROV et al.	6-2006
US 6,375,819 B1	LI et al.	4-2002
US 5,147,522	SARRINE	9-1992
US 5,348,633	KARGER et al.	9-1994
US 7,261,801 B2	SARME et al.	8-2007

WIkipedia article entitled "Interpreted language" downloaded January 22, 2009

Polymorphic Systems advertisement (no page number) in the Science Journal volume 199, published 10 March 1978.

(9) Grounds of Rejection

The following grounds of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 27 and 52 are rejected under 35 U.S.C. 102(b) as being anticipated by Virtanen et al. US 6402,919 B1 ("Virtanen").

Addressing claim 27, Virtanen discloses an apparatus for performing capillary electrophoresis (abstract),

comprising:

an inlet chamber (7);

a capillary electrophoresis column (1) with one end fixedly coupled to the inlet chamber (Figure 1);

a liquid source (R1 or R2 or R3) coupled to the inlet chamber through an input valve (shown, but not labeled in Figure 1, immediately underneath each reservoir R1, R2, and R3) to supply a liquid sample in a controlled manner to the inlet chamber (col. 03:45-50); and

a controller operatively coupled to the input valve and including executable instructions to convert and execute operational input to control the valve for providing a sample of the liquid source to the capillary electrophoresis column (implied by

col. 03:36-37, which states, "Operation of the entire apparatus can be controlled by means of a micro-processor."). Also note alternative embodiment shown in Figure 2 and discussed in col. 03:51 – col. 04:39.

Addressing claim 52, Virtanen discloses an apparatus for performing capillary electrophoresis (abstract),

comprising:

means for providing a liquid source in fluid communication via an inlet chamber (7) to an end of a capillary electrophoresis column (1) fixedly coupled to the inlet chamber (Figure 1; col. 03:15-31 and col. 03:38-44) means for converting and executing operational input and responsively controlling flow of the liquid source to the inlet chamber to provide a liquid sample in a controlled manner to the end of the capillary electrophoresis column (implied by col. 03:36-37, which states, "Operation of the entire apparatus can be controlled by means of a micro-processor."); and means for performing the capillary electrophoresis (col. 01:36-41 and col. 03:06-12). Also note alternative embodiment shown in Figure 2 and discussed in col. 03:51 – col. 04:39.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 28-34, 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Virtanen et al. US 6402,919 B1 ("Virtanen") in view of Nikiforov et al. US 7,060,171 B1 ("Nikiforov").

Addressing claim 28, Virtanen discloses an apparatus for performing capillary electrophoresis (abstract),

comprising:

an inlet chamber (7);

a capillary electrophoresis column (1) with one end fixedly coupled to the inlet chamber (Figure 1);

a liquid source (R1 or R2 or R3) coupled to the inlet chamber through an input valve (shown, but not labeled in Figure 1, immediately underneath each reservoir R1, R2, and R3) to supply a liquid sample in a controlled manner to the inlet chamber (col. 03:45-50); and

a controller operatively coupled to the input valve and including executable instructions to convert and execute operational input to control the valve for providing a sample of the liquid source to the capillary electrophoresis column (implied by col. 03:36-37, which states, "Operation of the entire apparatus can be controlled by means of a micro-processor."). Also note alternative embodiment shown in Figure 2 and discussed in col. 03:51 – col. 04:39.

Virtanen does not mention whether the executable instructions are compiled software. However, it would have been obvious to one with ordinary skill in the art at the time of the invention to have the executable instructions be compiled software

because then the instructions are in a form that can be altered (reprogrammed) to adapt them to changes in the apparatus or conditions under which the apparatus are to be used. It should be noted in this regard that as shown by Nikiforov it was known at the time of the invention to use an appropriately programmed computer to instruct a controller in a microchannel electrophoresis system. See col. 08:05-14. Barring a contrary showing Applicant is just applying a known technique (computer programming techniques) to a known device (Virtanen's device) for improvement to yield predictable results.

Addressing claim 29, Virtanen discloses an apparatus for performing capillary electrophoresis (abstract),

comprising:

an inlet chamber (7);

a capillary electrophoresis column (1) with one end fixedly coupled to the inlet chamber (Figure 1);

a liquid source (R1 or R2 or R3) coupled to the inlet chamber through an input valve (shown, but not labeled in Figure 1, immediately underneath each reservoir R1, R2, and R3) to supply a liquid sample in a controlled manner to the inlet chamber (col. 03:45-50); and

a controller operatively coupled to the input valve and including executable

instructions to convert and execute operational input to control the valve for providing a sample of the liquid source to the capillary electrophoresis column (implied by col. 03:36-37, which states, "Operation of the entire apparatus can be controlled by means of a micro-processor."). Also note alternative embodiment shown in Figure 2 and discussed in col. 03:51 – col. 04:39.

Virtanen does not mention whether the executable instructions are unchangeable. However, it would have been obvious to one with ordinary skill in the art at the time of the invention to have the executable instructions be unchangeable because then there is no risk of the controller accidentally changing the sampling procedure between runs. This is useful, for example, for repetitive runs are made for statistical analysis. It should be noted in this regard that as shown by Nikiforov it was known at the time of the invention to use an appropriately programmed computer to instruct a controller in a microchannel electrophoresis system. See col. 08:05-14. Barring a contrary showing Applicant is just applying a known technique (computer programming techniques) to a known device (Virtanen's device) for improvement to yield predictable results.

Addressing claim 30, Virtanen discloses an apparatus for performing capillary electrophoresis (abstract),

comprising:

an inlet chamber (7);

a capillary electrophoresis column (1) with one end fixedly coupled to the inlet chamber (Figure 1);

a liquid source (R1 or R2 or R3) coupled to the inlet chamber through an input valve (shown, but not labeled in Figure 1, immediately underneath each reservoir R1, R2, and R3) to supply a liquid sample in a controlled manner to the inlet chamber (col. 03:45-50); and

a controller operatively coupled to the input valve and including executable instructions to convert and execute operational input to control the valve for providing a sample of the liquid source to the capillary electrophoresis column (implied by col. 03:36-37, which states, "Operation of the entire apparatus can be controlled by means of a micro-processor."). Also note alternative embodiment shown in Figure 2 and discussed in col. 03:51 – col. 04:39.

Virtanen does not mention whether the executable instructions conform to a known industry standard. However, it would have been obvious to one with ordinary skill in the art at the time of the invention to do so because then the electrophoresis results will be more useful as it can be more fairly compared to results obtained by others who use instructions conform to industry standards. Indeed, it may be necessary to have the executable instructions conform to a known industry standard for quality control reasons or government regulations concerning drug quality control or environmental analysis. It should be noted in this regard that as shown by Nikiforov it was known at the time of the invention to use an appropriately programmed computer to

instruct a controller in a microchannel electrophoresis system. See col. 08:05-14. Barring a contrary showing Applicant is just applying a known technique (computer programming techniques) to a known device (Virtanen's device) for improvement to yield predictable results.

Addressing claim 31, Virtanen discloses an apparatus for performing capillary electrophoresis (abstract),

comprising:

an inlet chamber (7);

a capillary electrophoresis column (1) with one end fixedly coupled to the inlet chamber (Figure 1);

a liquid source (R1 or R2 or R3) coupled to the inlet chamber through an input valve (shown, but not labeled in Figure 1, immediately underneath each reservoir R1, R2, and R3) to supply a liquid sample in a controlled manner to the inlet chamber (col. 03:45-50); and

a controller operatively coupled to the input valve and including executable instructions to convert and execute operational input to control the valve for providing a sample of the liquid source to the capillary electrophoresis column (implied by

col. 03:36-37, which states, "Operation of the entire apparatus can be controlled by means of a micro-processor."). Also note alternative embodiment shown in Figure 2 and discussed in col. 03:51 – col. 04:39.

Virtanen does not mention whether the operational input includes declarative software instructions. However, it would have been obvious to one with ordinary skill in the art at the time of the invention to have the operational input includes declarative software instructions because then the user can specify what certain operational parameters should be without having to worry about how the controller will achieve the specified parameter values. An underlying procedural software will take of achieving the specified parameter values. It should be noted in this regard that as shown by Nikiforov it was known at the time of the invention to use an appropriately programmed computer to instruct a controller in a microchannel electrophoresis system. See col. 08:05-14. Barring a contrary showing Applicant is just applying a known technique (computer programming techniques) to a known device (Virtanen's device) for improvement to yield predictable results.

Addressing claim 32, Virtanen discloses an apparatus for performing capillary electrophoresis (abstract),

comprising:

an inlet chamber (7);

a capillary electrophoresis column (1) with one end fixedly coupled to the

inlet chamber (Figure 1);

a liquid source (R1 or R2 or R3) coupled to the inlet chamber through an input valve (shown, but not labeled in Figure 1, immediately underneath each reservoir R1, R2, and R3) to supply a liquid sample in a controlled manner to the inlet chamber (col. 03:45-50); and

a controller operatively coupled to the input valve and including executable instructions to convert and execute operational input to control the valve for providing a sample of the liquid source to the capillary electrophoresis column (implied by col. 03:36-37, which states, "Operation of the entire apparatus can be controlled by means of a micro-processor."). Also note alternative embodiment shown in Figure 2 and discussed in col. 03:51 – col. 04:39.

Virtanen does not mention whether the executable instructions convert the operational input by interpreting program instructions. However, it would have been obvious to one with ordinary skill in the art at the time of the invention to have the executable instructions convert the operational input by interpreting program instructions because then the user of the apparatus will not have to worry about how the controller will implement the operational input. It should be noted in this regard that as shown by Nikiforov it was known at the time of the invention to use an appropriately programmed computer to instruct a controller in a microchannel electrophoresis system. See col. 08:05-14. Barring a contrary showing Applicant is just applying a known technique (computer programming techniques) to a known device (Virtanen's device) for improvement to yield predictable results.

Addressing claim 33, Virtanen discloses an apparatus for performing capillary electrophoresis (abstract),

comprising:

an inlet chamber (7);

a capillary electrophoresis column (1) with one end fixedly coupled to the inlet chamber (Figure 1);

a liquid source (R1 or R2 or R3) coupled to the inlet chamber through an input valve (shown, but not labeled in Figure 1, immediately underneath each reservoir R1, R2, and R3) to supply a liquid sample in a controlled manner to the inlet chamber (col. 03:45-50); and

a controller operatively coupled to the input valve and including executable instructions to convert and execute operational input to control the valve for providing a sample of the liquid source to the capillary electrophoresis column (implied by col. 03:36-37, which states, "Operation of the entire apparatus can be controlled by means of a micro-processor."). Also note alternative embodiment shown in Figure 2 and discussed in col. 03:51 – col. 04:39.

Virtanen does not mention whether the operational input is modifiable independent of the executable instructions. However, it would have been obvious to one with ordinary skill in the art at the time of the invention to have the operational input be modifiable independent of the executable instructions because this will allow the operator of the apparatus to alter some of the operational parameters to adjust for a change in circumstances, such as the need to use a larger or smaller sample volume

than previously used. It should be noted in this regard that as shown by Nikiforov it was known at the time of the invention to use an appropriately programmed computer to instruct a controller in a microchannel electrophoresis system. See col. 08:05-14. Barring a contrary showing Applicant is just applying a known technique (computer programming techniques) to a known device (Virtanen's device) for improvement to yield predictable results.

Addressing claim 34, Virtanen discloses an apparatus for performing capillary electrophoresis (abstract),

comprising:

an inlet chamber (7);

a capillary electrophoresis column (1) with one end fixedly coupled to the inlet chamber (Figure 1);

a liquid source (R1 or R2 or R3) coupled to the inlet chamber through an input valve (shown, but not labeled in Figure 1, immediately underneath each reservoir R1, R2, and R3) to supply a liquid sample in a controlled manner to the inlet chamber (col. 03:45-50); and

a controller operatively coupled to the input valve and including executable instructions to convert and execute operational input to control the valve for providing a sample of the liquid source to the capillary electrophoresis column (implied by

col. 03:36-37, which states, "Operation of the entire apparatus can be controlled by means of a micro-processor."). Also note alternative embodiment shown in Figure 2 and discussed in col. 03:51 – col. 04:39.

Virtanen does not mention whether the controller includes an interface to receive the operational input from an external system. However, it would have been obvious to one with ordinary skill in the art to do so because then the controller can automatically adjust operating parameters based on measurement data. . It should be noted in this regard that as shown by Nikiforov it was known at the time of the invention to use an appropriately programmed computer to instruct a controller in a microchannel electrophoresis system. See col. 08:05-14. Barring a contrary showing Applicant is just applying a known technique (computer programming techniques) to a known device (Virtanen's device) for improvement to yield predictable results.

Addressing claim 36, Virtanen discloses an apparatus for performing capillary electrophoresis (abstract),

comprising:

an inlet chamber (7);

a capillary electrophoresis column (1) with one end fixedly coupled to the inlet chamber (Figure 1);

a liquid source (R1 or R2 or R3) coupled to the inlet chamber through an input

valve (shown, but not labeled in Figure 1, immediately underneath each reservoir R1, R2, and R3) to supply a liquid sample in a controlled manner to the inlet chamber (col. 03:45-50); and

a controller operatively coupled to the input valve and including executable instructions to convert and execute operational input to control the valve for providing a sample of the liquid source to the capillary electrophoresis column (implied by col. 03:36-37, which states, "Operation of the entire apparatus can be controlled by means of a micro-processor."). Also note alternative embodiment shown in Figure 2 and discussed in col. 03:51 – col. 04:39.

Virtanen does not mention whether the executable instructions include correspondence between predetermined indicators in the operational input and the input valve. However, it would have been obvious to one with ordinary skill in the art at the time of the invention to do so because then the volume of sample introduced into the capillary can be controlled.

7. Claims 34 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Virtanen et al. US 6402,919 B1 ("Virtanen") in view of Nikiforov et al. US 7,060,171 B1 ("Nikiforov") as applied to claims 28-34, 36 above, and further in view of Li et al. US 6,375,819 B1 ("Li") .

Virtanen discloses an apparatus for performing capillary electrophoresis (abstract),

comprising:

an inlet chamber (7);

a capillary electrophoresis column (1) with one end fixedly coupled to the inlet chamber (Figure 1);

a liquid source (R1 or R2 or R3) coupled to the inlet chamber through an input valve (shown, but not labeled in Figure 1, immediately underneath each reservoir R1, R2, and R3) to supply a liquid sample in a controlled manner to the inlet chamber (col. 03:45-50); and

a controller operatively coupled to the input valve and including executable instructions to convert and execute operational input to control the valve for providing a sample of the liquid source to the capillary electrophoresis column (implied by col. 03:36-37, which states, "Operation of the entire apparatus can be controlled by means of a micro-processor."). It should be noted in this regard that as shown by Nikiforov it was known at the time of the invention to use an appropriately programmed computer to instruct a controller in a microchannel electrophoresis system. See col. 08:05-14. Barring a contrary showing Applicant is just applying a known technique (computer programming techniques) to a known device (Virtanen's device) for improvement to yield predictable results. Also note alternative embodiment shown in Figure 2 and discussed in col. 03:51 – col. 04:39.

Virtanen does not mention whether the controller includes an interface to receive the operational input from an external system. Additionally, Virtanen does not mention using a network to couple the external system to the controller.

Li discloses an apparatus for performing capillary electrophoresis (abstract), comprising:

a controller (404) coupled to a data processing system through a local area network so that they can communicate with each other. See the abstract and col. 19:19-33. This implies providing the controller with an interface to receive the operational input from an external system and teaches using a network to couple the external system to the controller.

It would have been obvious to one with ordinary skill in the art to provide the controller with an interface to receive the operational input from an external system and teaches using a network to couple the external system to the controller as disclosed by Li in the invention of Virtanen because then the controller can automatically adjust operating parameters based on measurement data.

8. Claim 37 is rejected under 35 U.S.C. 103(a) as being unpatentable over Virtanen et al. US 6402,919 B1 ("Virtanen") in view of Nikiforov et al. US 7,060,171 B1 ("Nikiforov") as applied to claims 28-34, 36 above, and further in view of Sarrine US 5,147,522 ("Sarrine").

Virtanen discloses an apparatus for performing capillary electrophoresis (abstract),

comprising:

an inlet chamber (7);

a capillary electrophoresis column (1) with one end fixedly coupled to the inlet chamber (Figure 1);

a liquid source (R1 or R2 or R3) coupled to the inlet chamber through an input valve (shown, but not labeled in Figure 1, immediately underneath each reservoir R1, R2, and R3) to supply a liquid sample in a controlled manner to the inlet chamber (col. 03:45-50); and

a controller operatively coupled to the input valve and including executable instructions to convert and execute operational input to control the valve for providing a sample of the liquid source to the capillary electrophoresis column (implied by col. 03:36-37, which states, "Operation of the entire apparatus can be controlled by means of a micro-processor."). Also note alternative embodiment shown in Figure 2 and discussed in col. 03:51 – col. 04:39.

Virtanen does not mention having the executable instructions detect errors in the operational input.

Sarrine discloses an automatic electrophoresis apparatus and method. One of the operational inputs to the automation means is an input signal regarding the alignment of the sample source. The automation means is configured to detect an error in this signal. See col. 07:34-37 and col. 19:15-37. It would have been obvious to one with ordinary skill in the art to have the executable instructions detect errors in the operational input as taught by Sarrine in the invention of Virtanen because this is just applying a known technique to a known device ready for improvement to yield

predictable results. Note that although Sarrine's electrophoresis apparatus handles gel slabs and not capillaries the concept of detecting the error in the alignment of the sample source is still directly applicable to Virtanen.

9. Claim 38 is rejected under 35 U.S.C. 103(a) as being unpatentable over Virtanen et al. US 6402,919 B1 ("Virtanen") in view of Nikiforov et al. US 7,060,171 B1 ("Nikiforov") as applied to claims 28-34, 36 above, and further in view of Karger et al. US 5,348,633 ("Karger") or Särme et al. US 7,261,801 B2 ("Särme").

Virtanen discloses an apparatus for performing capillary electrophoresis (abstract),

comprising:

an inlet chamber (7);

a capillary electrophoresis column (1) with one end fixedly coupled to the inlet chamber (Figure 1);

a liquid source (R1 or R2 or R3) coupled to the inlet chamber through an input valve (shown, but not labeled in Figure 1, immediately underneath each reservoir R1, R2, and R3) to supply a liquid sample in a controlled manner to the inlet chamber (col. 03:45-50); and

a controller operatively coupled to the input valve and including executable instructions to convert and execute operational input to control the valve for providing a sample of the liquid source to the capillary electrophoresis column (implied by

col. 03:36-37, which states, "Operation of the entire apparatus can be controlled by means of a micro-processor."). Also note alternative embodiment shown in Figure 2 and discussed in col. 03:51 – col. 04:39.

Although Virtanen discloses that the inlet chamber may be coupled to a hydraulic system including a pump and at least one valve (col. 03:15-19 and col. 03:39-44) Virtanen does not mention including rough and fine filters. Karger and Särme each teach filtering sample before it is introduced in an electrophoresis separation capillary. See in Karger col. 01:10-17 and col. 06:32-43 and in Särme see the abstract and col. 05:12-23. It would have been obvious to one with ordinary skill in the art to provide filtering means as taught by Karger or Särme in the invention of Virtanen because this is just applying a known technique to a known device ready for improvement to yield predictable results. Filtering the sample will improve electrophoresis separation, resolution, and detection by removing substances that would otherwise interfere with analyte separation and detection.

10. Claims 39, 40, 49, and 51 are rejected under 35 U.S.C. 103(a) as being unpatentable over Virtanen et al. US 6402,919 B1 ("Virtanen").

Addressing claim 39, Virtanen discloses a method for performing capillary electrophoresis (abstract),

comprising:

providing a liquid source (R1 or R2 or R3) in fluid communication via an inlet chamber (7) to an end of a capillary electrophoresis column (1) fixedly coupled to the inlet chamber (Figure 1). Also note alternative embodiment shown in Figure 2 and discussed in col. 03:51 – col. 04:39.

Virtanen does not specifically mention "in response to converting and executing operational input, controlling flow of the liquid source to the inlet chamber to provide a liquid sample in a controlled manner to the end of the capillary electrophoresis column." However, it would have been obvious to one with ordinary skill in art at the time of the invention to do so because Virtanen states, "Operation of the entire apparatus can be controlled by means of a micro-processor." See col. 03:45-50.

Addressing claim 40, Virtanen's use of a micro-processor implies at least executing executable machine language instructions.

Addressing claim 49, Virtanen does not mention determining correspondence between predetermined indicators in the operational input and a device used to control the flow of the liquid source. However, it would have been obvious to one with ordinary skill in the art at the time of the invention to do so because then the volume of sample introduced into the capillary can be controlled.

Addressing claim 51, Virtanen discloses that the inlet chamber may be coupled to a hydraulic system including a pump and at least one valve (col. 03:15-19 and col. 03:39-44)

11. Claims 41-46 are rejected under 35 U.S.C. 103(a) as being unpatentable over Virtanen et al. US 6402,919 B1 ("Virtanen") as applied to claims 39, 40, 49, and 51 above, and further in view of Nikiforov et al. US 7,060,171 B1 ("Nikiforov").

Addressing claim 41, Virtanen does not mention whether the executable instructions are compiled software. However, it would have been obvious to one with ordinary skill in the art at the time of the invention to have the executable instructions be compiled software because then the instructions are in a form that can be altered (reprogrammed) to adapt them to changes in the apparatus or conditions under which the apparatus are to be used. It should be noted in this regard that as shown by Nikiforov it was known at the time of the invention to use an appropriately programmed computer to instruct a controller in a microchannel electrophoresis system. See col. 08:05-14. Barring a contrary showing Applicant is just applying a known technique (computer programming techniques) to a known device (Virtanen's device) for improvement to yield predictable results.

Addressing claim 42, Virtanen does not mention whether the executable instructions are unchangeable. However, it would have been obvious to one with ordinary skill in the art at the time of the invention to have the executable instructions be unchangeable because then there is no risk of the controller accidentally changing the sampling procedure between runs. This is useful, for example, for repetitive runs are made for statistical analysis. It should be noted in this regard that as shown by Nikiforov it was known at the time of the invention to use an appropriately programmed computer to instruct a controller in a microchannel electrophoresis system. See col. 08:05-14. Barring a contrary showing Applicant is just applying a known technique (computer programming techniques) to a known device (Virtanen's device) for improvement to yield predictable results.

Addressing claim 43, Virtanen does not mention whether the executable instructions conform to a known industry standard. However, it would have been obvious to one with ordinary skill in the art at the time of the invention to do so because then the electrophoresis results will be more useful as it can be more fairly compared to results obtained by others who use instructions conform to industry standards. Indeed, it may be necessary to have the executable instructions conform to a known industry standard for quality control reasons or government regulations concerning drug quality control or environmental analysis. It should be noted in this regard that as shown by Nikiforov it was known at the time of the invention to use an appropriately programmed

computer to instruct a controller in a microchannel electrophoresis system. See col. 08:05-14. Barring a contrary showing Applicant is just applying a known technique (computer programming techniques) to a known device (Virtanen's device) for improvement to yield predictable results.

Addressing claim 44, Virtanen does not mention whether the operational input includes declarative software instructions. However, it would have been obvious to one with ordinary skill in the art at the time of the invention to have the operational input includes declarative software instructions because then the user can specify what certain operational parameters should be without having to worry about how the controller will achieve the specified parameter values. An underlying procedural software will take of achieving the specified parameter values. It should be noted in this regard that as shown by Nikiforov it was known at the time of the invention to use an appropriately programmed computer to instruct a controller in a microchannel electrophoresis system. See col. 08:05-14. Barring a contrary showing Applicant is just applying a known technique (computer programming techniques) to a known device (Virtanen's device) for improvement to yield predictable results.

Addressing claim 45, Virtanen does not mention whether the executable instructions convert the operational input by interpreting program instructions. However,

it would have been obvious to one with ordinary skill in the art at the time of the invention to have the executable instructions convert the operational input by interpreting program instructions because then the user of the apparatus will not have to worry about how the controller will implement the operational input. It should be noted in this regard that as shown by Nikiforov it was known at the time of the invention to use an appropriately programmed computer to instruct a controller in a microchannel electrophoresis system. See col. 08:05-14. Barring a contrary showing Applicant is just applying a known technique (computer programming techniques) to a known device (Virtanen's device) for improvement to yield predictable results.

Addressing claim 46, Virtanen does not mention whether the operational input is modifiable independent of the executable instructions. However, it would have been obvious to one with ordinary skill in the art at the time of the invention to have the operational input be modifiable independent of the executable instructions because this will allow the operator of the apparatus to alter some of the operational parameters to adjust for a change in circumstances, such as the need to use a larger or smaller sample volume than previously used. It should be noted in this regard that as shown by Nikiforov it was known at the time of the invention to use an appropriately programmed computer to instruct a controller in a microchannel electrophoresis system. See col. 08:05-14. Barring a contrary showing Applicant is just applying a known technique (computer programming techniques) to a known device (Virtanen's device) for improvement to yield predictable results.

12. Claims 47 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Virtanen et al. US 6402,919 B1 ("Virtanen") as applied to claims 39, 40, 49, and 51 above, and further in view of Li et al. US 6,375,819 B1 ("Li") .

Virtanen discloses a method for performing capillary electrophoresis (abstract), comprising:

providing a liquid source (R1 or R2 or R3) in fluid communication via an inlet chamber (7) to an end of a capillary electrophoresis column (1) fixedly coupled to the inlet chamber (Figure 1). Also note alternative embodiment shown in Figure 2 and discussed in col. 03:51 – col. 04:39.

Virtanen does not specifically mention "in response to converting and executing operational input, controlling flow of the liquid source to the inlet chamber to provide a liquid sample in a controlled manner to the end of the capillary electrophoresis column." However, it would have been obvious to one with ordinary skill in art at the time of the invention to do so because Virtanen states, "Operation of the entire apparatus can be controlled by means of a micro-processor." See col. 03:45-50.

Virtanen does not mention whether converting and executing operational input includes receiving operational input from an external systems, such as by interfacing to an external system via a network.

Li discloses an apparatus for performing capillary electrophoresis (abstract), comprising:

a controller (404) coupled to a data processing system through a local area network so that they can communicate with each other. See the abstract and

col. 19:19-33. This implies providing the controller with an interface to receive the operational input from an external system and teaches using a network to couple the external system to the controller.

It would have been obvious to one with ordinary skill in the art to provide the controller with an interface to receive the operational input from an external system and teaches using a network to couple the external system to the controller as disclosed by Li in the invention of Virtanen because then the controller can automatically adjust operating parameters based on measurement data.

13. Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Virtanen et al. US 6402,919 B1 ("Virtanen") as applied to claims 39, 40, 49, and 51 above, and further in view of Sarrine US 5,147,522 ("Sarrine").

Virtanen discloses an apparatus for performing capillary electrophoresis (abstract),

comprising:

an inlet chamber (7);

a capillary electrophoresis column (1) with one end fixedly coupled to the inlet chamber (Figure 1);

a liquid source (R1 or R2 or R3) coupled to the inlet chamber through an input

valve (shown, but not labeled in Figure 1, immediately underneath each reservoir R1, R2, and R3) to supply a liquid sample in a controlled manner to the inlet chamber (col. 03:45-50); and

a controller operatively coupled to the input valve and including executable instructions to convert and execute operational input to control the valve for providing a sample of the liquid source to the capillary electrophoresis column (implied by col. 03:36-37, which states, "Operation of the entire apparatus can be controlled by means of a micro-processor."). Also note alternative embodiment shown in Figure 2 and discussed in col. 03:51 – col. 04:39.

Virtanen does not mention having the executable instructions detect errors in the operational input.

Sarrine discloses an automatic electrophoresis apparatus and method. One of the operational inputs to the automation means is an input signal regarding the alignment of the sample source. The automation means is configured to detect an error in this signal. See col. 07:34-37 and col. 19:15-37. It would have been obvious to one with ordinary skill in the art to have the executable instructions detect errors in the operational input as taught by Sarrine in the invention of Virtanen because this is just applying a known technique to a known device ready for improvement to yield predictable results. Note that although Sarrine's electrophoresis apparatus handles gel slabs and not capillaries the concept of detecting the error in the alignment of the sample source is still directly applicable to Virtanen.

(10) Response to Argument

A. The Claimed Invention in Context

Appellants' claims are essentially directed to a computer controlled capillary electrophoresis apparatus. Appellants appear to believe that their patentable innovation lies in a controller that

> ... includes executable instructions, such as compiled software (i.e., software that is unchangeable by the end user), that has instructions to convert and execute operational input to control the hydraulic subsystem. The executable instructions may be unchangeable and conform to a known industry standard, such as American National Standards Institute (ANSI) (e.g., ANSI 'C' programming language). The operational input may include instructions, such as declarative software instructions, that are interpreted by the compiled software. *See page 7 of Appellants' Appeal Brief.*

In the Examiner's view using a programmed computer that accepts user input to control operations during a capillary electrophoresis run was anticipated or obvious at the time of the alleged invention.

B. Virtanen Discloses all the Elements of Claims 27 and 52

Appellants do not dispute that Virtanen discloses as required by independent Claim 27

An apparatus for performing capillary electrophoresis, comprising:
an inlet chamber;
a capillary electrophoresis column with one end fixedly coupled to the inlet chamber; [and]
a liquid source coupled to the inlet chamber through an input valve to supply a liquid sample in a controlled manner to the inlet chamber;

or as required by independent Claim 52

An apparatus for performing capillary electrophoresis comprising:
means for providing a liquid source in fluid communication via an inlet chamber to an end of a capillary electrophoresis column fixedly coupled to the inlet chamber;
...; and
means for performing the capillary electrophoresis.

The disputed issue is whether Virtanen discloses as required by Claim 27

a controller operatively coupled to the input valve and including executable instructions to convert and execute operational input to control the valve for providing a sample of the liquid source to the capillary electrophoresis column

and as required by Claim 52

means for converting and executing operational input and responsively controlling flow of the liquid source to the inlet chamber to provide a liquid sample in a controlled manner to the end of the capillary electrophoresis column; ...

There are three key terms in the disputed limitation of Claim 27: "a controller", "executable instructions", and "operational input". None of these terms are defined in the specification. Page 6 describes them in an open manner (emphasis added by the Examiner):

> The executable instructions **may** be unchangeable and conform to known industry standard, such as American National Standards Institute (ANSI) (e.g., ANSI 'C' programming language).
>
> The operational input **may** include instructions, such as declarative software instructions, that are interpreted by the compiled software. The operational input **may** be modifiable independent of the compiled software. In this way, once the system with the compiled software is delivered to a customer, the customer can develop or modify the operational input without altering the compiled software.
>
> The controller **may** include an interface to receive the operational input from an external system. Such an external system may be local to the system or coupled to the 15 interface via a network, such as the Internet.

Appellants largely restate these interpretations of the terms on page 10, second paragraph, of the Appeal Brief. Thus, since these terms are undefined by Appellants the Examiner may give them their broadest reasonable interpretation. MPEP 2173.05(b).III. As such, the Examiner does not believe that he has to restrict his interpretation of these terms to how Appellants state they *may* be implemented.

Virtanen states, "Operation of the entire apparatus can be controlled by means of a micro-processor." See column 03, lines 36-37. He also states, "If desirable, it is possible to select any application and running conditions at all and to modify those during a run" and "By using an apparatus of the invention, it is easy to select an implement initial and boundary conditions for various electrophoresis applications. In addition is possible to use combined methods by modifying the boundary conditions during an electrophoresis run". Additionally, varying several operational parameters, including solution flow, is disclosed. See column 04, lines 35-46. Virtanen is disclosing using a micro-processor to control various operating functions, including valve control, and operating parameters of a capillary electrophoresis run that are selected and may

be adjusted by a person before and even during the electrophoresis run. In the Examiner's view, these statements or even just the first statement alone do not mean literally providing an isolated microchip. Associated circuitry is inherently included to make up what is understood to be a computer. To the Examiner's best knowledge computers as conventionally understood operate on executable instructions. Since the person performing the electrophoresis run with the apparatus of Virtanen may select the operating parameters before and even during the electrophoresis run this implies that the controller receive operational input.

Appellants states, "One may implant a controller that performs standard controlling functions (e.g., for automation) without converting and executing operational input; in fact, an implementation without such elements would be standard practice." See the last paragraph on page 10 of the Appeal Brief. Appellants also refer to the Declaration received on June 01, 2009 in this regard, which attempts to liken the capillary electrophoresis apparatus of Virtanen to a "turnkey style" automated system. The Examiner disagrees with this characterization. The controller in Virtanen is not an inflexible hard-wired circuit that is only used to have the capillary electrophoresis apparatus analyze the same sample type under the same operating conditions for every electrophoresis run. At the beginning of the main text of the patent, Virtanen states, "The present invention relates to a capillary electrophoresis apparatus, suitable for readily performing a *variety* of capillary electrophoresis processes, such as zone electrophoresis, isoelectric focusing, and electrokinetic micelle-chromatography. [emphasis added]" See column 01, lines 01-09. These are significantly different

electrophoresis separation techniques requiring different operating parameters. So the operator would input different operating parameters depending on the separation technique used. Virtanen also does limit sample or analyte type and allows for adjusting operating parameters even during a run. Even if the electrophoresis run is completely automated, which it does not have to be, Virtanen allows the operating conditions, such as valving, to be changed before the beginning of a new run. All of this user input and control implies receiving operational input processed by executable instructions, not hard-wired circuitry.

Appellants states on page 11, first full paragraph, of the Appeal Brief,

> However, the mere use of the word "operatively" by Virtanen, in conjunction with "adjusting," "controlling," and "modifying," does not mean that Virtanen teaches "convert[ing] and execut[ing] operational input" as in Claim 27 (emphasis added).

The Examiner disagrees. How else can a person operatively adjust, control, or modify the capillary electrophoresis operations in the apparatus of Virtanen using a microprocessor other than by the microprocessor executing operational input?

The last paragraph on page 11 of the Appeal Brief acknowledges that Virtanen discloses execution of operational input, but asserts that Virtanen does not disclose also converting the operational input. Appellant appears to read into this limitation that the operational input is converted from an English-like pseudo language. See page 10, second paragraph, of the Appeal Brief. The Examiner does not read such a restriction into claim 27. Microprocessors process digital signals, that is, binary signals. Whatever form the operational input may be in as provided by the user of the apparatus of

Virtanen, there is no suggestion in Virtanen that a user will *directly* enter binary signals. The operational input will be provided by the user in some from that is converted to digital signals.

On page 12, bridging to page 13 of the Appeal Brief Appellants discuss the Declaration under 37 C.F.R. § 1.132 submitted May 27, 2009 (received by the Patent and Trademark Office on June 01, 2009) ("Declaration") and the Advisory action mailed on June 11, 2009 ("Advisory action"). Appellants opine that part of the Examiner's statement in the Advisory action is speculative and reiterate their view in the Declaration that Virtanen only discloses a turnkey automated capillary electrophoresis system. Whether the Examiner did make a speculative statement or not in the Advisory action, as already discussed above, Virtanen does disclose a microprocessor controlled capillary electrophoresis apparatus, including valves, that allows an operator to set operating conditions, including solution flows, before the run begins, and allows adjusting of operating conditions during the run. The capillary electrophoresis apparatus of Virtanen is not a hard-wired apparatus that can only repeat the same set of operations. In particular, there is no suggestion in Virtnaen that the valves underneath reservoirs R1-R3 in Figure 1 can only be opened in a fixed manner.

In the second full paragraph on page 13 of the Appeal Brief Appellants states, "Claim 52 recites similar elements as Claim 27 and is not anticipated for at least the same reason as presented above." The Examiner in turn relies on his arguments above showing why Claim 27 is anticipated as also establishing that Claim 52 is anticipated.

C. Virtanen Does Render Obvious Claim 39

Since Claim 39 recites similar elements as Claim 52 Appellants appear to rely on their arguments against the rejections of Claims 27 and 52, which have already been responded to by the Examiner.

D. Virtanen and Nikiforov Render Obvious Claim 32

Appellants assert that the passage in Nikiforv (column 08, lines 05-13) relied upon by the Examiner, reproduced from Appellants Brief here

> [Nikiforov's] system also includes a detector 404 as well as a computer or processor 406 that is operably coupled to both the detector 404 and the controller 402. The computer typically includes appropriate programming to receive user input information and transfer that information into instructions for the flow controller. The computer also typically receives the data from the detector and manages that data into a user understandable presentation.

"... refers to conventional control techniques that one of ordinary skill in the art (of electrophoresis) would have sought, e.g., turnkey-style execution of embedded instructions using a microcontroller." See page 14 of the Appeal Brief. Even though Nikiforov explicitly states, "The computer typically includes appropriate programming to receive user input information and transfer that information *into* instructions for the flow controller [emphasis added]" Appellants appear to believe that Virtanen in combination with NIkiforov only discloses a hard-wired controller for capillary

electrophoresis that only follows a fixed set of operating steps and operating parameters. Claims 32 adds the limitation, "The apparatus according to Claim 27 wherein the executable instructions convert the operational input by interpreting program instructions." Again, Appellants are reading significant restrictions into the vague terms and phrase "executable instructions", "converting the operational input", and "program instructions" that are not in the specification or clarified by the Appeal Brief. To dismiss the teachings of Virtanen and Nikiforov as being "turnkey" or "conventional" automated systems while Appellant uses vague terms that conventionally refer to using a computer program to accept user input for controlling different aspects, such as flow, in a capillary electrophoresis apparatus is not persuasive.

On the bottom of page 14, bridging to page 15 Appellants assert that the Wikipedia article entitled "Interpreted language", which is referred to on page 5 of the Final Rejection is remote art. The Examiner disagrees. Claim 32 has the phrase "interpreting program instructions." Virtanen as modified by Nikiforov does not mention whether the program instructions are interpreted or compiled. The WIkipedia article states,

> "Theoretically, any language may be compiled or interpreted, so this designation is applied purely because of common implementation practice and not some underlying property of a language ... Many languages have been implemented using both compilers and interpreters, including Lisp, Pascal, C, BASIC, and Python [emphasis added]." See the first two paragraphs of the article.

This passage is relevant because the specific limitation to which the Wikipedia article is addressed concerns computer programming not capillary electrophoresis.

Whatever computer programming language Virtanen as modified by Nikiforov contemplated could be interpreted.

The second full paragraph on page 15 of the Appeal Brief refers to the capillary electrophoresis of Virtanen as modified by Nikiforov as a "turnkey" automated system. Again, a "computer [that] typically includes appropriate programming to receive user input information and transfer that information into instructions for the flow controller" is most certainly not a "turnkey" automated system in which the operator just presses the "on" button and the computer fixedly repeats the same operation steps. In the second full paragraph on page 15 of the Appeal Brief Appellants also state,

> In other words, the art of interpreted languages is "remote" with respect to capillary electrophoresis in the context of MPEP 2141.03, and it would not have been obvious to one of ordinary skill in the art (of capillary electrophoresis) to combine Virtanen and Nikiforov/Wikipedia to arrive at Claim 32.

The Examiner disagrees. On page 5 of the Final Rejection the Examiner mentions an advertisement in Science Journal, which shows that interpreted BASIC was commercially available for use by scientists since at least 1978.

In the penultimate paragraph on page 15 of the Appeal Brief Appellants states, "Similar arguments apply for Claim 45, which also recites interpreting program instructions." The Examiner in turn relies on his counter-arguments above.

E. Virtanen, Nikiforov and Sarrine Render Obvious Claim 37

With regard to the rejection of Claim 37 in which Sarrine was used to provide error detection, Appellants merely state on page 16 of the Appeal Brief that Sarrine only discloses error detection "... of the kind conventionally found in automation systems, e.g., turnkey systems as in the discussion above about a person of ordinary skill being a chemist." Again, Appellants read into a claim restrictions that are not explicitly or implicitly required by the original disclosure. Moreover, as already discussed Virtanen as modified by Nikiforv does not disclose a hard-wired controller that repeats fixedly the same operation steps and the same operating parameters for every capillary electrophoresis run.

In the penultimate paragraph on page 16 of the Appeal Brief Appellants states, "Similar arguments apply for Claim 50, which also recites detecting errors in operational input." The Examiner in turn relies on his counter-arguments above.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Alex Noguerola/

Primary Examiner, Art Unit 1795

Conferees:

/Nam X Nguyen/

Supervisory Patent Examiner, Art Unit 1753

/Christopher A. Fiorilla/

Chris Fiorilla

Supervisory Patent Examiner, Art Unit 1700